21.0 UPPER WILLAMETTE WINTER STEELHEAD ESU

21.1 BACKGROUND

21.1.1 Description of the ESU

The following are historical winter steelhead populations that have been identified by the Technical Recovery Team (Myers *et al.* 2002) for the Upper Willamette winter steelhead ESU.

21.1.1.1 Molalla. The population of steelhead in the Molalla River includes only naturally-produced winter run fish. No hatchery winter or summer steelhead have been released into the Molalla River since the late 1990s.

21.1.1.2 North Santiam. The population of steelhead in the North Santiam River includes only naturally-produced winter run fish. No hatchery winter steelhead have been released into the North Santiam River since the late 1990s. Hatchery summer steelhead from South Santiam hatchery stock are released into the North Santiam River. However, this hatchery stock is not part of the North Santiam population or Upper Willamette ESU because the summer run was introduced into the Willamette Basin from Skamania stock (out of the ESU).

21.1.1.3 South Santiam. The population of steelhead in the South Santiam River includes only naturally-produced winter run fish. No hatchery winter steelhead have been released into the South Santiam River since the late 1990s. Hatchery summer steelhead from South Santiam hatchery stock are released. However, this hatchery stock is not part of the South Santiam population or Upper Willamette ESU because the summer run was introduced into the Willamette Basin from Skamania stock (out of the ESU).

21.1.1.4 Calapooia. The population of steelhead in the Calapooia River includes only naturally-produced winter run fish. No hatchery winter steelhead or summer steelhead have been released into the Calapooia River since the late 1990s.

21.1.1.5 Westside Tributaries. It is unclear if the westside tributaries (Tualatin, Yamhill, Rickreal, and Luckiamute rivers) represent a historic, independent population of winter steelhead. However, naturally-reproduced winter steelhead would be included in the ESU. No hatchery winter or summer steelhead are released into the westside tributaries.

Table 21.1. List of natural winter steelhead identified by the Lower Columbia/Willamette TRT (Myers *et al.* 2002) for the Upper Willamette winter steelhead ESU, hatchery stocks released in each population area, and a description of the current hatchery programs.

TRT populations	Hatchery Program (included, not included ESU)	Integrated or Isolated Program	Program description	Size of program (smolts)	Year in operation
Molalla winter steelhead	none				
North Santiam winter steelhead	S. Santiam summer steelhead (not included ESU)	isolated	smolt	161,500	1973
South Santiam winter steelhead	S. Santiam summer steelhead (not included ESU)	isolated	smolt	144,000	1973
Calapooia winter steelhead	none				
Westside Tributaries winter steelhead	none				
Summary: Currently no winter steelhead programs exist in the ESU. The summer steelhead programs are from an out of ESU stock. Summer steelhead are not native to the Upper Willamette Basin.					

21.1.2 Current Status of the ESU

The BRT (2003) was encouraged by significant increases in adult returns (exceeding 10,000 total fish) in 2001 and 2002 for the Upper Willamette River *O. mykiss* ESU. The recent 5-year mean abundance, however, remains low for an entire ESU (5,819 adults), and individual populations remain at low abundance. Long-term trends in abundance are negative for all populations in the ESU, reflecting a decade of consistently low returns during the 1990s. Short-term trends, buoyed by recent strong returns, are positive. The ESU continues to be spatially well distributed in the four major subbasins in the ESU (the Molalla, North Santiam, South Santiam, and Calapooia Rivers), however, approximately one-third of the ESUs historical spawning habitat is now blocked. There is some uncertainty about the historical occurrence of *O. mykiss* in the Oregon Coastal Range drainages, but because coastal cutthroat trout is a dominant species in the Willamette basin *O. mykiss* are not as widespread in this ESU as they are east of the Cascade Mountains. The BRT considered the cessation of the "early" winter-run hatchery program a positive sign for ESU diversity risk, but remained concerned that releases of non-native summer steelhead continue. Because coastal cutthroat trout is dominant in the basin, resident *O. mykiss* are not as abundant or widespread here as in the inland *O. mykiss* ESUs. The BRT did not consider resident fish to reduce risks to ESU abundance, and their contribution to ESU productivity, spatial structure, and diversity is uncertain.

The BRT (2003) found moderate risks for each of the VSP categories. Based on this risk assessment, the majority opinion of the BRT was that the Upper Willamette River *O. mykiss*

ESU is “likely to become endangered within the foreseeable future.” The minority BRT opinion was that the ESU is “not in danger or extinction or likely to become endangered within the foreseeable future.”

All of the current steelhead hatchery programs are isolated from the natural stocks. Only non-native summer steelhead are released in the ESU.

21.2 ASSESSMENT OF HATCHERY PROGRAMS

No hatchery steelhead that are included in the Upper Willamette winter steelhead ESU are currently being released. Only non-native hatchery summer steelhead are released into the South and North Santiam rivers. Hatchery fish are also released into the Clackamas, McKenzie, and Middle Fork Willamette Rivers. However these areas are not within the geographic boundaries of the Upper Willamette ESU. The purpose of the hatchery summer steelhead program in the Willamette Basin is harvest mitigation. Since summer run are introduced in the Willamette Basin, the management goal is not minimize the potential negative effects of this hatchery program on native winter steelhead. This includes minimizing the number of summer run spawning naturally, minimizing juvenile interactions after summer run smolts are released, and minimizing the incidental fishery effects on winter steelhead from anglers targeting summer steelhead.

Since only hatchery fish that are not included in the ESU are being released, there would be no benefits to VSP parameters for the ESU. Some new information on summer steelhead spawning is now available that was not considered by the BRT in 2003. This new information is included in the following population by population assessment.

21.2.1 Molalla

Hatchery steelhead are no longer released into the Molalla River. However, Firman and Buckman (2003) observed low densities of summer steelhead spawning in the mainstem Molalla River, Abiqua Creek, North Fork Molalla River, Cougar Creek, and Lost Creek in 2003 (Figure 21.2). Since summer steelhead are not native to the Upper Willamette River, the summer steelhead hatchery program is a risk to listed winter steelhead. Studies have shown adverse effects from non-native summer run on native winter run, especially when summer run spawn in the same areas as winter run fish (Chilcote 1998). Summer steelhead represent a risk to the abundance, productivity, spatial structure, and diversity of the Molalla winter steelhead population.

21.2.2 North Santiam

Non-native hatchery summer steelhead are released in the North Santiam River. Recent information suggests not all of the summer steelhead returning are harvested by anglers. Firman and Buckman (2003) observed low to high densities of summer steelhead spawning in the mainstem North Santiam River, Rock Creek, Mad Creek, Elkhorn Creek, and Sinker Creek in 2003 (Table 21.1; Figure 21.1). The North Santiam River had the highest densities of summer steelhead redds observed in any of the winter steelhead populations in the ESU. Studies have

shown adverse effects from non-native summer run on native winter run because the summer run spawn earlier and thus can gain a competitive advantage once the progeny hatch and rear in the stream (Chilcote 1998). Summer steelhead were observed spawning from January through March. Native winter run spawning occurs from March through June. Any natural production by non-native summer run would be a risk to the abundance, productivity, spatial structure, and diversity of the North Santiam winter steelhead population.

21.2.3 South Santiam

Hatchery summer steelhead are released in the South Santiam River. Recent information suggests not all of the summer steelhead returning are harvested by anglers. Firman and Buckman (2003) observed low densities of summer steelhead spawning in the mainstem South Santiam River, Wiley, Crabtree, and Thomas Creek in 2003. Studies have shown adverse effects from non-native summer run on native winter run because the summer run spawn earlier and thus can gain a competitive advantage once the progeny hatch and rear in the stream (Chilcote 1998). Summer steelhead were observed spawning from January through March. Native winter run spawning occurs from March through June. Any production by non-native summer run would be a risk to the abundance, productivity, spatial structure, and diversity of the South Santiam winter steelhead population.

21.2.4 Calapooia

Hatchery summer steelhead are not released in the Calapooia River. Few summer steelhead have been observed in recent years in the Calapooia River. In 2003, Firman and Buckman (2003) did not find any summer run redds in three surveys conducted in the headwaters of the Calapooia Basin. However, winter run redds were observed later in the winter. This information suggests the summer steelhead program may not affect the Calapooia winter steelhead population. However, only one year of data has been collected. Any production by non-native summer run would be a risk to the local winter steelhead population.

Table 21.2. Comparison of summer steelhead (StS) and winter steelhead (StW) redd counts in 2003 on traditional surveys. Average and maximum values for winter steelhead are based on 17 to 30 years of data. Table from Firman and Buckman (2003).

Subbasin	Stream	StS Redds	StW Redds	Avg StW Redds	Max StW Redds
N Santiam River	Rock Cr.	19	49	6	16
N Santiam River	Mad Cr.	26	27	40	77
N Santiam River	Elkhorn Cr.	6	18	9	31
N Santiam River	Sinker Cr.	14	13	24	63
S Santiam River	Wiley Cr, upper	2	19	4	11
S Santiam River	Wiley Cr, lower	1	16	10	26
S Santiam River	Crabtree Cr.	0	6	27	93
S Santiam River	Thomas Cr.	2	13	17	35
Calapooia River	N Fk Calapooia	0	11	15	76
Calapooia River	Potts Cr	0	2	8	15

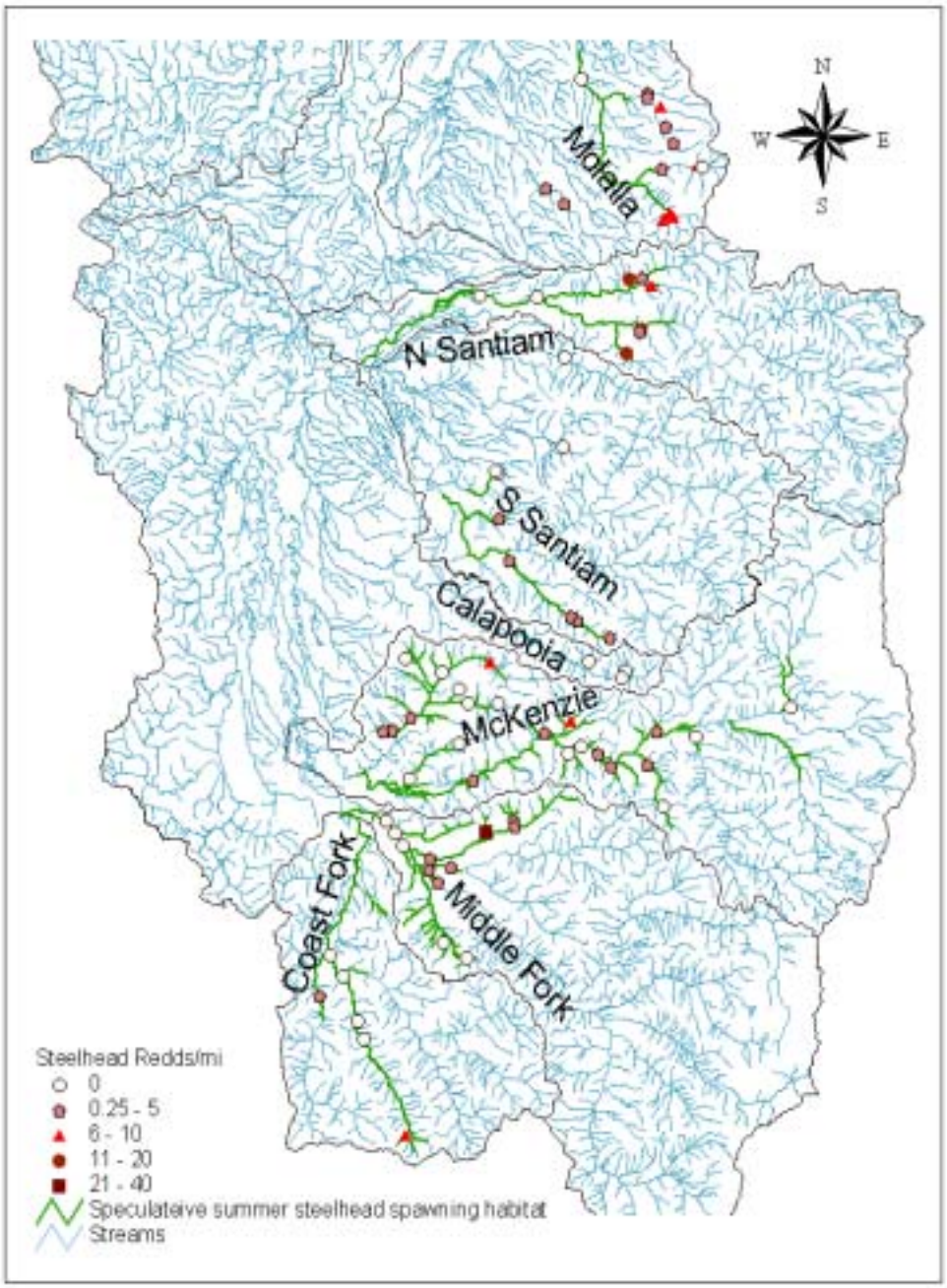

Figure 21.1. Summer steelhead redd densities in randomly selected surveys and traditional winter steelhead surveys in the Upper Willamette ESU, 2003. Summer steelhead are not included in the ESU. From Firman and Buckman (2003).

21.2.5 Westside Tributaries

It is unclear if the tributaries (Tualatin, Yamhill, Rickreal, and Luckiamute rivers) on the westside of the Willamette River Basin represent an historic, independent population of winter steelhead (Myers *et al.* 2002). However, no hatchery steelhead are released currently into any of these tributaries. Summer steelhead spawning surveys have not been conducted in these tributaries. However, it is presumed spawning of non-native steelhead would be low due to low stream flows during the migration period of summer run.

21.3 CONCLUSION

Existing Status: Threatened
BRT Finding: Threatened
Recommendation: Threatened

21.3.1 ESU Overview

21.3.1.1 History of Populations

The Willamette/Lower Columbia Technical Recovery Team identified four historic populations (Molalla, North Santiam, South Santiam, and Calapooia) of winter steelhead in the Upper Willamette winter steelhead ESU (Myers *et al.* 2002). The TRT was uncertain whether the Westside tributaries represented an independent population historically. Summer steelhead were not present historically above Willamette Falls and thus not included in the ESU.

21.3.1.2 Association Between Natural Populations and Artificial Propagation

Natural populations "with minimal genetic contribution from hatchery fish"

There are currently no hatchery winter steelhead programs in the ESU. The last winter steelhead program was eliminated in 1998. Therefore all of populations likely have minimal genetic contribution from hatchery winter steelhead.

Natural[a] populations "that are stable or increasing, are spawning in the wild, and have adequate spawning and rearing habitat" [b]

The BRT (2003) did not identify any of the winter steelhead populations as being self-sustaining. All of the abundance trends over the last 20 to 30 years have been strongly downward.

Mixed (Integrated Programs[c])

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[a] See HLP for definition of natural, mixed and hatchery populations

[b] HLP Point 3

[c] Integrated programs follow practices designed to promote and protect genetic diversity

There are no hatchery winter steelhead programs in the ESU. Hatchery summer steelhead programs are not included as part of the ESU.

Hatchery (Isolated[d])

No hatchery programs are included as part of the ESU. Summer steelhead programs are not included in the ESU.

21.3.2 SUMMARY OF ESU VIABILITY

Abundance

The BRT (2003) showed all available abundance estimates exhibiting downward trends over the last 20 to 30 years. There has been recent increases in the abundance of natural fish. However, even the recent improvements are less than abundances observed prior to the early 1990s.

Productivity

Long term productivity rates have averaged less than one.

Spatial Structure

All of the populations have been affected by habitat degradation or impassable barriers that have reduced the amount of spawning and rearing habitat available for the ESU.

Diversity

The elimination of winter steelhead programs using Big Creek stock (out of ESU) benefited the conservation of the ESU. There is still concern regarding the impacts from the non-native summer steelhead hatchery programs and the intermixing of summer and winter fish on the spawning grounds.

21.3.3 Artificial Propagation Record

Experience with Integrated Programs

There are no integrated programs included as part of the ESU.

Are Integrated Programs Self-Sustaining

Not applicable.

Certainty that Integrated Programs will Continue to Operate

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and only use fish from the same local population for broodstock (both natural-origin fish, whenever possible, and hatchery-origin fish derived from the same local population and included in the ESU). Programs operated to protect genetic diversity in the absence of natural-origin fish (e.g., captive broodstock programs and the reintroduction of fish into vacant habitat) are considered “integrated”.

[d] Isolated programs do not follow practices designed to promote or protect genetic diversity. Fish that are reproductively isolated are more likely to diverge genetically from natural populations included in the ESU and to be excluded themselves from the ESU.

There are no integrated programs that are included as part of the ESU.

21.3.4 Summary of Overall Extinction Risk Faced by the ESU

There have been increases in abundance of most steelhead populations in the ESU since 2000. However, long term trends in abundance of all the monitoring areas are strongly downward. The BRT could not identify any of the populations as being self-sustaining. There is also concern about the loss of habitat from degradation or being blocked by dams. The non-native summer steelhead hatchery programs in the Willamette Basin are a risk to the conservation of the ESU.

21.4 LITERATURE CITED

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